

REMARKS

Status of the Application

Claims 1-11 are pending. Claims 1, 3-5 and 10 were rejected. Claims 2, 4, 6-9 and the drawings were objected to by the Examiner. Claim 11 is newly added.

Claims 1-4, 6 and 8-9 are amended. The amendments to claims 1-3, 6, and 9 are supported by the originally filed claims. The amendments to claim 4 are supported in the specification on page 7, lines 16-32. Claim 8 is amended to include the equations set forth on page 12, lines 1-4. Claim 11 is supported by the originally filed claim 1. No new matter has been added.

Reconsideration of the Official Action is respectfully requested in view of the below remarks.

Objections to Disclosure

The Title was objected to as allegedly not being descriptive. The Title has been amended. Applicant respectfully submits that the amended Title is sufficiently descriptive and requests that the objection to the Title be withdrawn.

The disclosure was objected to as allegedly including informalities. In particular, the Examiner objected to use of the terms "notional," "rotating axis," and "rotationally stationary" in certain sections of the specification. The amendments to the specification obviate these objections.

The Examiner objected to the disclosure as allegedly not clearly defining what type of sensor is used for vector sensor 14. Applicant respectfully submits that the type of sensor is sufficiently described on page 7, lines 12-14 as "a sensor for measuring the amplitude of the earth magnetic field or gravity along an axis OX radial to the shaft." Such sensors are well known to one of ordinary skill in the art to include, for example, magnetometers for sensing direction of the earth's magnetic field and accelerometers for sensing gravity radial to the shaft.

In view of the amendments to the Specification and the remarks above, Applicant respectfully submits that the specification does not include any informalities and requests that the objections to the Specification be withdrawn.

Objection to Drawings

The drawings were objected to as allegedly not showing every feature of the invention shown in claim 9. In view of the amendment to claim 9, the objection to the drawings is obviated. Accordingly, Applicant respectfully requests that the objection to the drawings be withdrawn.

Objections to Claims

Claims 2, 4, and 8 were objected to as allegedly having informalities. Applicants submit that the claims 2, 4, and 8, as amended, do not include any informalities. Applicant respectfully submits that such amendments do not add new matter and are not proffered for patentability purposes, but rather, to merely correct the ministerial mistakes brought to light by the Examiner. Accordingly, Applicant respectfully requests that the objections to the claims be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claims 1, 3-5, and 10 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 4,647,853 to Cobern (hereinafter "Cobern") in view of U.S. Patent No. 5,302,893 to Yoshimura (hereinafter "Yoshimura").

Claim 1 includes a feature neither disclosed nor suggested by Cobern, Yoshimura, or any combination thereof, namely:

an orientation signal generator which ... derives from the pulse train and the output of the earth vector sensor the angle between the earth vector and a given position on the sleeve. [emphasis added].

Neither Cobern nor Yoshimura discloses or suggests deriving the angle between an earth vector and a given position on the sleeve.

Cobern discloses a system for measuring the speed of rotation of a downhole turbine (abstract). The Cobern system uses a triaxial magnetometer with three windings (col. 4, lines 24-26) and a magnet mounted to the turbine shaft to measure the speed (col. 4, lines 45-50) to measure the speed of rotation. However, Cobern does not disclose deriving the angle between an earth vector and a position on a sleeve.

Cobern teaches away from deriving such an angle because Cobern discloses that the functions of sensing of the earth's magnetic field and sensing rotational speed of the turbine are separated from each other (col. 6, lines 7-11). Specifically, the Cobern system filters field signals to provide filtered signals that correspond either to speed of rotation or to the earth's magnetic field, not both (col. 6, lines 11-13 and Fig. 4). The Cobern system switches between a first mode where it measures the earth's magnetic field and a second mode where it measures the rotation speed of the turbine (col. 6, lines 32-37). The angle between an earth vector and a position on a sleeve can not be derived by the system of Cobern because it alternately provides information on the speed of rotation and information on the earth's magnetic field without providing information on both for a given time.

The Yoshimura reference does not remedy the basic deficiencies in Cobern. Yoshimura discloses a magnetic encoder in an unrelated technology and does not disclose the claimed feature above. Yoshimura teaches a coated magnetic recording encoder which is commonly used for controlling the rotational speed of a capstan motor in a Video Tape Recorder of the like. The device shown in Yoshimura is from a completely unrelated field. It has nothing to do with the field of oilfield devices. For this reason alone, the combination is improper.

In addition, one feature recited in the independent claims is that the sleeve is journaled on the shaft and adapted to be stationary during rotation of the shaft. This allows gamma logging while drilling. In Figure 7A of Yoshimura, the non-magnetic substrate 11 and the recording medium 12 are not adapted to be stationary during rotation of the shaft (not referenced in figure 7A). As a result, an MWD tool as disclosed in Cobern, provided with a sleeve as in Yoshimura, would not be adapted to be stationary during drilling.

Accordingly, the invention recited in independent claims 1 and 10 is patentable over the combination of Yoshimura and Cobern.

Furthermore, the Examiner has not established a prima facie obviousness inasmuch as the Examiner has not shown where the motivation is for person of ordinary skill in the art to make the modifications suggested by the Examiner to the Cobern reference. The Examiner is simply looking for features of the claimed invention in the prior art. This is improper.

Accordingly, Applicants assert that claim 1 is patentable over the Cobern and Yoshimura references, alone or in combination, for all the reasons set forth above, and in particular that claim 1 includes the feature of an orientation signal generator which derives the angle between the earth vector and a given position on the sleeve. Claim 2 includes the same feature and claims 3-9 depend from claims 1 or 2 and therefore include all the features of claim 1 or claim 2. Claim 10 is a method claim that includes the feature of deriving the angle between the earth vector and a given position on the sleeve. For the reasons set forth above with respect to claim 1, claim 10 recites subject matter that is not obvious in view of the combination of references cited by the Examiner.

Newly added claim 11 includes the feature of a means for deriving the angle between the earth vector and a given position on the sleeve. Accordingly, Applicants assert that claims 2-11 are patentable over the cited references at least for the same reasons as discussed above with regard to the patentability of claim 1.

Allowable Claims

The Examiner objected to claims 2 and 6-9 as depending upon a rejected base claim and indicated that such claims would be allowable if rewritten in independent form. Claims 2 and 6 have been rewritten in independent form. Claims 7 and 8 depend from claim 6 and claim 9 depends from claim 2. Accordingly, Applicant respectfully requests that the objection to claims 2 and 6-9 be withdrawn.

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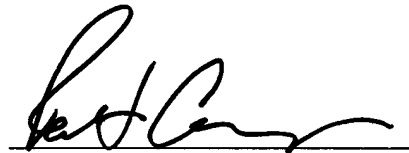
CONCLUSION

Based on the foregoing, Applicants respectfully submit that all of the pending claims as presented herein stand in a condition for allowance. Accordingly, a Notice of Allowance is respectfully requested. Should the Examiner wish to discuss this reply in further detail the Examiner is requested to contact the undersigned attorney at (215) 988-3303.

Respectfully submitted,

Michael Russell

BY:



ROBERT E. CANNUSCIO
Registration No. 36,469
Drinker Biddle & Reath LLP
One Logan Square
18th and Cherry Streets
Philadelphia, PA 19103-6996
Tel: 215-988-3303
Fax: 215-988-2757
Attorney for the Applicants